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ABSTRACT

Presented is an outline of a basic course (low level) in biology for students whose interest and background are very limited. The study and dissection of earthworm, crayfish, perch, and bird are included. A detailed study of the frog is undertaken as a representative of the animal kingdom. Performance objectives are presented, as well as a course outline based on a phylogenetic approach to the zoology course. A master sheet lists the objectives by number and itemizes the various texts involved with specific chapters noted. Laboratory activities, demonstrations, projects, suggested reports, field trips, films and film loops, as well as other curriculum events corresponding to each objective are included. Suggested innovative activities and additional references are also provided. (EB)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

ANIMALS FROM THE OUTSIDE IN

5314.01

SCIENCE

(Experimental)

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

SE 016 515

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5314.01

SCIENCE

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Written by David Z. Kleinman
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida
1972

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ANIMALS FROM THE OUTSIDE IN

COURSE DESCRIPTION

An elective low level course in introductory Biology. It is the study and dissection of common animals such as the earthworm, crayfish, perch, and bird. The course offers a detailed study of the frog as the main representative of the animal kingdom.

ENROLLMENT GUIDELINES

This is a basic course in biology for students whose interest and background in science is very limited.

STATE ADOPTED TEXTS

1. Biological Sciences Curriculum Study. High School Biology Green Version 2nd ed. Chicago: Rand McNally, 1968

2. Biological Sciences Curriculum Study. Patterns and Processes. New York: Holt, Rinehart and Winston, 1966.

3. Brandwein, Paul F.; Burnett, R. Will; and Stoliberg, Robert. Life its Forms and Changes. New York: Harcourt, Brace and World, 1968.

4. Oxenhorn, Joseph M., and Idelson, Abraham. Pathways in Science. Biology 1. New York: Glove Book Company, Inc., 1968.

5. Oxenhorn, Joseph M., and Idelson, Abraham. Pathways in Science. Biology 2. New York: Glove Book Company, Inc., 1968.

6. Oxenhorn, Joseph M., and Idelson, Abraham. Pathways in Science. Biology 3. New York: Glove Book Company, Inc., 1968.

7. Smallwood, William, and Green, Edith. Biology. Morriston, New Jersey: Silver Burdett Company, 1971.

8. Thurber, Walter A., and Kilburn, Robert A. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1966.

PERFORMANCE OBJECTIVES

1. The student will demonstrate the scientific method by performing a controlled experiment.
2. The student will differentiate between vertebrates and invertebrates.
3. The student will identify one edible mollusk, arthropod, fish, bird, reptile or mammal.
4. The student will describe how to obtain information about any animal studied in the course from local, state, and federal agencies.
5. The student will dissect either a vertebrate or an invertebrate.
6. The student will compare similarities and differences between frogs and humans.
7. The student will identify various insect eating birds.
8. Given selected species which are in danger of extinction the student will propose possible causes.

COURSE OUTLINE

I. Characteristics of Animals

   A. Movement

   B. Consumers of energy

   C. Producers of CO_2

II. How Animals are Grouped

   A. Protozoa

      1. Disease producers

      2. Scavangers

COURSE OUTLINE (Continued)

B. Animals without backbones

1. Earthworms

a. Food source
b. Soil conditioners
c. Dissection of an earthworm

2. Insects

a. Economic value

(1) Pollination
(2) Diseases

b. Grasshopper as a representative insect

3. Mollusks, crustaceans and the seafood industry

a. Clams
b. Snails
c. Squid and octopus
d. Shrimp, crabs and lobsters
e. Dissection of a crayfish

C. Animals with backbones

1. Fish

a. Sport fish
b. Freshwater pollution and fish
c. Fish and mosquito control
d. Fish dissection

2. Amphibians

a. Toads
b. Salamanders

3. Other vertebrates

a. Reptiles

(1) Poisonous snakes in Florida
(2) Turtles
(3) The endangered alligator

COURSE OUTLINE (Continued)

b. Birds

(1) Insect control
(2) Endangered species

c. Mammals

(1) Familiar mammals
(2) Wierd mammals
(3) Endangered mammals

III. The Frog as a Representative Animal

A. Two lives for the price of one

1. The frog in the water

2. The frog on land

B. The frog dissection

1. External structures

a. Amphibious adaptations
b. Skin circulation

2. Superficial muscles

a. Composition
b. Function

3. Internal organs

a. Function
b. Similarity to human organs

4. The circulatory system

a. Three chambered heart
b. Large blood vessels

5. The skeletal system

a. Important structures
b. Similarity to human

6. The brain and central nervous system

a. Reaction to stimuli
b. Similarity to other animals

LABORATORY EXPERIMENTS

Brandwein, Paul; Burnett, R. Will; and Stollberg, Robert. Life, Its Forms and Changes. New York: Harcourt, Brace and World, Inc., 1968.

1. The Frog (pp. 97-103)
2. Variety in the Protozoans (p. 311)
3. The Amoeba (p. 313)
4. The Earthworm (pp. 344-346)
5. The Grasshopper (pp. 356-359)
6. The Fish (pp. 379-384)
7. The Development of the Frog (pp. 388-389)
8. The Anatomy of a Bird (a chicken) (pp. 406-408)

Otto, James; Towle, Albert; and Crider, Elizabeth. Biology Investigations. New York: Holt, Rinehart and Winston, Inc., 1965.

9. Study of Cells (exp. 4-1, p. 33)
10. Variation in Cell Structure (exp. 4-2, p. 35)
11. Principles of Diffusion (exp. 5-1, p. 37)
12. Porifera the Sponges (exp. 27-1, p. 237)
13. The Earthworm (exp. 28-3, p. 251)
14. Mollusca (exp. 29-1, p. 257)
15. The Crustaceans (exp. 30-1, p. 261)
16. The Grasshopper (exp. 31-1, p. 267)
17. External Structure of the Frog (exp. 35-1, p. 281)
18. Dissection of the Frog (exp. 35-2, p. 281)

Green, Edna R., and Bobrowsky, Kenneth. Laboratory Investigations In Biology. Morristown, New Jersey: Silver-Burdett Company, 1971.

19. The Earthworm (exp. 23, p. 91)
20. The Grasshopper (exp. 24, p. 97)
21. The Frog (exp. 25, p. 103)
22. Fertilization of Frog Eggs (exp. 41, p. 175)
23. Early Development of the Embryo (exp. 42, p. 179)

Thurber, Walter A. and Kilburn, Robert E. Exploring Life Science. Boston: Allyn and Bacon Inc., 1966.

24. Analyzing a Community (pp. 30-33)
25. Hardiness of Seeds (p. 94)
26. Experimental Research (p. 107, #1 and 2)

LABORATORY EXPERIMENTS (Continued)

Curriculum Bulletin 8F Biology. Miami, Florida: Dade County Public Schools, 1969.

This is an excellent reference with many activities for the terminal student.

DEMONSTRATIONS

1. To demonstrate the effects of DDT or other water pollutants;
   a. Set up two ten gallon fish tanks with several goldfish.
   b. Put the polluting agent in one and not the other.
   c. Be sure to remove the fish before they die.
2. To demonstrate the need for fish as mosquito control agents;
   a. Collect mosquito wigglers from a stagnant puddle.
   b. Place them in a tank with gambusia or goldfish.

PROJECTS

1. Have students present recipes and methods for the cleaning and cooking the following:

   1. Clams
   2. Snails
   3. Crayfish
   4. Lobsters
   5. Turtles
   6. A sport fish (Bass, Trout or Bluegill)
   7. Octopus
   8. Frog's legs
   9. Crabs
   10. Shrimp

   Optional: If it is possible, have students prepare and serve samples to the class.

PROJECTS (Continued)

2. Have the students mount and label the bones of a frog or any other animal studied during this course. (Optional) Use a "plastic man" model to compare the skeleton of the frog (or other animal) to the human.

3. Make a notebook or poster of 10 animals which are considered to be in danger of extinction.

REPORTS

1. The effect of the Red Tide on fishing in Florida waters.

2. The effects of fertilizer run off on Lake Apopka and Lake Okeechobee. Tell how eutrophication has effected sport fishing in the two lakes.

3. The cycle of malaria, try to determine the reason we have so few cases in the United States.

4. Read Silent Spring by Rachael Carson and report on her findings about biological controls of insects.

5. Alligator poaching in Florida and why the hides are so important.

6. Florida's unusual animals such as:

   a. The poison toad
   b. Sea cow
   c. The flamingo
   d. The key deer
   e. Walking catfish

FIELD TRIPS

1. Take a fishing trip to a nearby canal or lake; use cane poles; try to identify the fish caught. See how many types of birds, insects and mammals can be identified.

2. Crandon Park Zoo
   Key Biscayne - Telephone: 361-5421

3. Everglades National Park
   Telephone: 247-6211

4. Monkey Jungle
   14805 S. W. 216 Street
   Telephone: 235-1611

5. Parrot Jungle
   11100 S. Red Road (SW 57 Avenue)
   Telephone: 661-3636

6. Seaquarium
   Rickenbacker Causeway
   Telephone: 361-5703

7. Serpentarium
   12655 South Dixie Highway
   Telephone: 235-5722

SPEAKERS

1. Speakers on Conservation and Marine Resources, write to:

   Environmental Science Service Administration
   901 South Miami Avenue
   Miami, Florida

2. Speakers on Marine and Atmospheric Sciences, write to:

   Rosensthiel School of Marine and Atmospheric Science
   University of Miami
   Rickenbacker Causeway
   Miami, Florida 33149

SPEAKERS (Continued)

For Other Speakers on Related Subjects, write or call:

3. South Florida Veterinary Association
   Dr. Eli Gersten
   6100 South Dixie Highway
   Miami Telephone: 667-7238

4. Tropical Audubon Society
   Mrs. Flora O'Brien
   4440 W. Flagler
   Miami

5. Everglades National Park
   P. O. Box 269
   Homestead, Florida
   Telephone: 247-6211

FILMS - FROM DADE COUNTY PUBLIC SCHOOLS AUDIOVISUAL CENTER

1. The Living Soil
   AV # 1-14066, 20 min., C.

2. Rival World
   AV # 1-31402, 27 min. C.

3. The River Must Live
   AV # 1-14067, 21 min., C.

4. Scientific Method
   AV # 1-00183, 11 min., C.

5. Scientific Method in Action
   AV # 1-10079, 19 min., C.

6. Characteristics of Plants and Animals
   AV # 1-30539, 28 min., C.

7. Micro Organisms: Beneficial Activities
   AV # 1-11358, 15 min., C.

8. Micro Organisms: Harmful Activities
   AV # 1-11358, 15 min., C.

9. Earthworm
   AV # 1-02734 and 1-02735, 10 min. ea., C.

FILMS - FROM DADE COUNTY PUBLIC SCHOOLS AUDIOVISUAL CENTER (Continued)

10. Mollusks
AV # 1-11149, 14 min., C.

11. Insect Life Cycle
AV # 1-02787, 11 min., C.

12. Fish and Their Characteristics
AV # 1-02831, 11 min., C.

13. Frogs and Toads
AV # 1-02849, 10 min., C.

14. Frogs
AV # 1-02845, 10 min., C.

15. Life Cycle of a Frog
AV # 1-02852, 11 min., C.

16. Life Cycle of a Frog
AV # 1-02790, 11 min., B/W

17. Frog Anatomy
AV # 1-11182, 17 min., C.

18. Amphibians
AV # 1-02824, 11 min., C.

19. Introducing the Reptiles
AV # 1-11183, 17 min., B/W

20. Reptile
AV # 1-11186, 15 min., C.

21. Dinosaur (Aibs)
AV # 1-30673, 27 min., C.

22. Reptiles and Their Characteristics
AV # 1-02865, 11 min., C.

23. Bird Community
AV # 1-02904, 12 min., C.

24. Birds of the Florida Marsh
AV # 1-11196, 14 min., C.

25. Natures Birds of Prey
AV # 1-30710, 30 min., C.

FILMS - FROM DADE COUNTY PUBLIC SCHOOLS AUDIOVISUAL CENTER (Continued)

26. Birds and Their Characteristics
AV # 1-02892, 11 min., C.

27. Water Birds
AV # 1-02995, 12 min., C.

28. Big Animals of Africa
AV # 1-02386, 11 min., C.

29. Big Animals of North America
AV # 1-02383, 11 min., C.

FILM LOOPS

The following are available from:

Ward's Natural Science Establishment
P. O. Box 1712
Rochester, New York 14603
(1970-1971 Catalog Supplement)

1. Octopus
73W1912, $19.95, 2 min., & 2 sec.

2. Protozoans
73W1951, $19.95, 3 min., & 57 sec.

3. Clam
73W1910, $19.95, 2 min., & 16 sec.

4. Crayfish
73W1942, $19.95, 2 min., & 33 sec.

5. Mosquito Life Cycle
73W1890, $19.95, 4 min., & 30 sec.

6. Earthworm
73W1916, $19.95, 3 min., & 8 sec.

7. Frog Heartbeat I
73W1721, $19.95, 3 min., & 45 sec.

8. Frog Heartbeat II
73W1722, $19.95, 4 min., & 55 sec.

FILM LOOPS (Continued)

9. Frog Anatomy External and Oral
73W1738, $19.95, 4 min., & 30 sec.

10. Frog Skeletal System
73W1739, $19.95, 4 min., & 30 sec.

11. Frog Muscular System
73W1740, $19.95, 4 min., & 30 sec.

12. Frog Digestive System
73W1741, $19.95, 4 min.

13. Frog Respiratory System
73W17X2, $19.95, 4 min.

14. Frog Circulatory System
73W1744, $19.95, 4 min., & 50 sec.

15. Frog Urogenital System
73W1743, $19.95, 4 min.

16. Frog Nervous System
73W1745, $19.95, 4 min.

PRESERVED MATERIAL FOR DISSECTION AVAILABLE FROM WARD'S

1. Earthworms
60W2200, $17.00 per hundred.

2. Crayfish
60W2810, $18.00 per hundred.

3. Grasshoppers
60W4150, $12.00 per hundred.

4. Yellow Perch
61W1551, $150.00 per hundred.

5. Frogs
61W2342, $288.00 per hundred.

6. Turtle
61W3340, $160.00 per hundred.

7. Pigeons (Similar to Chicken)
61W4472, $300.00 per hundred.

LIVING MATERIALS AVAILABLE FROM WARD'S

1. Amoeba Proteus
   87W0390, $3.00 per class unit.

2. Mixed Protozoa
   87W1500, $3.50 per class unit.

3. Mixed Pond Protozoa
   87W1510, $3.50 per class set.

4. High School Protozoa Set
   87W1550, $9.00 per class set.

DISCUSSION QUESTIONS

1. List five similarities and five differences between vertebrates and invertebrates.

2. Describe the life cycles of three parasitic invertebrates and give methods for protecting people from being infected by them.

3. Why should all meat, and especially pork, be thoroughly cooked?

4. What is the main disadvantage of deep-frying food at high temperatures for a long time?

5. Name one distinguishing characteristic for each of the groups listed below.

   a. Arthropods
   b. Flatworms
   c. Fishes
   d. Amphibians
   e. Reptiles
   f. Birds
   g. Mammals
   h. Primates

ADDITIONAL INNOVATIVE ACTIVITY

Instructions to the student:

1. The letters below contain the names of many familiar animals.
2. Circle as many words as you can find. They are written forward, backward, up, down and diagonally.
3. As you find the words, write them in the column at the side of the page.
4. Circle all the words you find, but write them only once.
5. Write one word on each line in the column at the side of the page.
6. All the words must have five or more letters.
7. Define or describe all the words you find on the back of this page.

V S H A R K B S C D E K A N S
G E O A E L E P H A N T F P H
H K R R L M N I E P Q R O R U
J Z S T Y X W D V A T N S I M
N R E H E W X E B C G G H M A
A S T R V B Y R D E F L J A N
E T M O Z W R O B I N K E T M
C U H P J X E A B C D F G E A
A O E O P N P N T M K B L H N
T R R D Q O T I G E R S T K A
S T O A R B I N S E C T P L T
U P N M L B L V A R T S N M E
R K L P Q I E M O N K E Y N E
C J M N R G M R O W D N U O R
F L A T W O R M H G F D C B M

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

ADDITIONAL INNOVATIVE ACTIVITY (Continued)

Teachers Answer Key

1. Vertebrate
2. Crustacean
3. Arthropod
4. Reptile
5. Sponge
6. Insect
7. Roundworm
8. Flatworm
9. Mollusk
10. Octopus
11. Amphibian
12. Turtle
13. Snake
14. Eagle
15. Robin
16. Coral
17. Heron
18. Trout
19. Shark
20. Bream
21. Monkey
22. Gibbon
23. Horse
24. Tiger
25. Human
26. Elephant
27. Manatee
28. Primate
29. Amoeba
30. Spider

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____

REFERENCES

I. Available from Esso Chemical Inter-America
396 Alhambra Circle
Coral Gables, Florida 33134

1. Cultivator
2. Insects

II. Available from the Florida Department of Agriculture, Tallahassee, Fla.

3. Ants in the Home & Garden, Home & Garden Bulletin #28
4. Control of Caterpillars, Farm Bulletin 2099
5. Commercial Vegetable Insect and Disease Control Guide, Circular 193 F
6. Florida Bee Keeping, Bulletin 10
7. Florida Rocket Gopher, Circular 310

REFERENCES (Continued)

8. Mole Control, Circular 248

9. Screw Worms and Their Control, Circular 107

III. Available from the Audubon Society
1130 5th Avenue
New York, New York 10028

10. Audubon Society Nature Bulletin Life in a Pond, 20¢

11. Bird Migration Map

12. Lets Explore a Backyard (NB3 & 7)

IV. Available from the Florida Game and Freshwater Fish Commission
South Gadsen Street
Tallahassee, Florida

13. Animal Tracks

14. Facts for Florida Fishermen

15. Florida's Game Animals

V. Available from the National Wildlife Federation
1412 N. W. 16 Street
Washington, D.C. 20036

16. Wildlife of Coastal Waters

17. Wildlife of Farm and Field

18. Wildlife of Forests and Range Lands

19. Wildlife of Lakes, Streams and Marshes

VI. Available from Publishers Listed.

20. Davis, Adelle. Lets Cook it Right. New York: Signet Books, 1969.

21. Davis, Adella. Lets Eat Right to Keep Fit. New York: Signet Books, 1970.

22. Engel, Leonard. The Sea. Life Nature Library Series. New York: Time Life Inc., 1969.

REFERENCES (Continued)

23. Reid, George K.; Zim, Herbert S. and Fichter, George S. Pond Life. New York: Golden Press, 1967.

24. Stephens, William M. Southern Seashores. New York: Holiday House, 1968.

25. Swain, Suzan N. Insects and their World. Garden City, New York: Garden City Books, 1955.

26. Zim, Herbert S. and Cottam, Clarence. Insects. New York: Golden Press, 1956.

27. Zim, Herbert S. and Gabrielson, Ira H. Birds. New York: Golden Press, 1949.

28. Zim, Herbert S. and Hoffmeister, Donald F. Mammals. New York: Golden Press, 1955.

29. Zim, Herbert S. and Ingle, Lester. Seashores. New York: Golden Press, 1955.

30. Zim, Herbert S. and Shoemaker, Hurst H. Fishes. New York: Golden Press, 1955.

31. Zim, Herbert S. and Smith, Hobart M. Reptiles and Amphibians. New York: Golden Press, 1953.

MASTER SHEET - ANIMALS FROM THE OUTSIDE IN

Objectives	Texts	Labs	Demonstrations	Projects	Reports	Field Trips	Speakers	Films	Film Loops	Discussion Questions	Additional Activities	References
1	#8 Ch. 1 #1 Ch. 1 #7 Ch. 1 #2 Ch. 1 #4 Unit 1	2,7 11,22,23 24,25,26	1,2		3,4		1,2,3	4,5, 22		4		9
2	#8 pp. 401-432 #1 Ch. 4,6 #3 Ch. 14,15 #6 Unit 1	2 1,3,4,5, 6 12,9,10	2	1			3,4,5	1,2 6,12,13 15		1,2		23,29
3	#1 Ch. 7,8 #3 Ch. 14,15, 16 #6 Unit III	5,8,14 17,18 15,16		1 3		1,2,3 4,5,6 7	4,5	14,19, 20	1,3,4	3,4	1	 16,17,18,19, 20,21,22,23,24, 29,31
4					1,2,5, 6	2,3,4	1,2,3, 4,5					I,II,III,IV,V,VI
5	#3 Ch. 5,14 Ch. 15,16	1,4,5,6,3 13,17,18, 19,20,21		2			3,4	9,17	7,8,9, 10,11, 12,13, 14,15, 16			
6	#3 Ch. 5 #2 pp. 257 to 270 #8 pp. 401-432	1,17,18, 21		1,2			3,5	9,17, 18	10,11 12,15 14,15	5		28
7	#1 Ch. 7,8,10 #3 Ch. 16	8		3		1,5	1,2,4	23,24, 25,26, 27	5		1	23,24,27,29
8	#1 Ch. 10,18, 20 #3 Ch. 20 #8 pp. 433-464		1,2	3	1,2, 4,5	3,5	1,4,5	23,24, 25,27, 28,29				10,11,12,16,17,19, 24,27,28,29